Amendments to the Claims

This listing of claims will replace all prior versions, and listings of claims in the application.

1. (currently amended) An isolated nucleic acid molecule comprising a polynucleotide selected from the group consisting of:

   a. polynucleotide sequence encoding a polypeptide comprising amino acids from about 1 to about 908 in SEQ ID NO:5;

   b. a polynucleotide sequence encoding a polypeptide comprising amino acids from about 1 to about 859 in SEQ ID NO:6;

   c. a polynucleotide sequence encoding a polypeptide comprising amino acids from about 1 to about 912 in SEQ ID NO:7;

   d. a polynucleotide sequence encoding a polypeptide comprising amino acids from about 1 to about 853 in SEQ ID NO:8;

   e. a polynucleotide sequence that is at least 95% identical to the polynucleotide sequence of (a), (b), (c) or (d); and

   f. a ~~polynucleotyide~~ polynucleotide sequence complementary to the ~~polynuleeotide~~ polynucleotide sequence of (a), (b), (c), (d) or (e).

2. (cancelled)

3. (original) A method of making a recombinant vector comprising inserting an isolated nucleic acid molecule of Claim 1 into a vector selected from a group consisting of:

    a. a DNA vector; and

    b. an RNA vector.

4. (original) A recombinant vector comprising the isolated nucleic acid molecule of Claim 1.

5. (original) A method of making a recombinant host cell comprising introducing the recombinant vector of Claim 4 into a host cell.

6. (original) A recombinant host cell comprising the vector of Claim 4.

7. (original) A method for producing a *de novo* DNA cytosine methyltransferase polypeptide, comprising culturing the recombinant host cell of Claim 6 under conditions such that said polypeptide is expressed and recovering said polypeptide.

8. (previously presented) An isolated nucleic acid molecule comprising polynucleotides selected from the group consisting of:

    a. at least 50 contiguous nucleotides of SEQ ID NO:1, provided that said nucleotides are not AA052791(SEQ ID

NO: 9); AA111043(SEQ ID NO:10); AA154890(SEQ ID NO:11); AA240794(SEQ ID NO:12); AA756653(SEQ ID NO:13); W58898(SEQ ID NO:14); W59299(SEQ ID NO:15); W91664(SEQ ID NO:16); W91665(SEQ ID NO:17); or any subfragment thereof; and

b. a nucleotide sequence complementary to a nucleotide sequence in (a).

9. (previously presented) An isolated nucleic acid molecule comprising polynucleotides selected from the group consisting of:

a. at least 30 contiguous nucleotides of SEQ ID NO:2, provided that said nucleotides are not AA116694 (SEQ ID NO:18); AA119979 (SEQ ID NO:19); AA177277 (SEQ ID NO:20); AA210568 (SEQ ID NO:21); AA399749 (SEQ ID NO:22); AA407106 (SEQ ID NO:23); AA575617 (SEQ ID NO:24); or any subfragment thereof; and

b. a nucleotide sequence complementary to a nucleotide sequence in (a).

10. (previously presented) An isolated nucleic acid molecule comprising polynucleotides selected from the group consisting of:

a. at least 100 contiguous nucleotides of SEQ ID NO:3, provided that said nucleotides are not AA004310 (SEQ ID

NO:25); AA004399 (SEQ ID NO:26); AA312013 (SEQ ID NO:27); AA355824 (SEQ ID NO:28); AA533619 (SEQ ID NO:29); AA361360 (SEQ ID NO:30); AA364876 (SEQ ID NO:31); AA503090 (SEQ ID NO:32); AA533619 (SEQ ID NO:33); AA706672 (SEQ ID NO:34); AA774277 (SEQ ID NO:35); AA780277 (SEQ ID NO:36); H03349 (SEQ ID NO:37); H04031 (SEQ ID NO:38); H53133 (SEQ ID NO:39); H53239 (SEQ ID NO:40); H64669 (SEQ ID NO:41); N26002 (SEQ ID NO:42); N52936 (SEQ ID NO:43); N88352 (SEQ ID NO:44); N89594 (SEQ ID NO:45); R19795 (SEQ ID NO:46); R47511 (SEQ ID NO:47); T50235 (SEQ ID NO:48); T78023 (SEQ ID NO:49); T78186 (SEQ ID NO:50); W22886 (SEQ ID NO:51); W67657 (SEQ ID NO:52); W68094 (SEQ ID NO:53); W76111 (SEQ ID NO:54); Z38299 (SEQ ID NO:55); Z42012 (SEQ ID NO:56); G06200(SEQ ID NO:74); or any subfragment thereof; and

b. a nucleotide sequence complementary to a nucleotide sequence in (a).

Claims 11-12 (canceled)

13. (previously presented) A method for *in vitro de novo* methylation of DNA, comprising:

a. contacting said DNA with a *de novo* DNA cytosine methyltransferase polypeptide encoded by the nucleic acid molecule of claim 1;

b. providing an appropriately buffered solution with substrate and cofactor; and

c. purifying said DNA.

Claims 14-23 (cancelled)

24. (previously presented) The nucleic acid molecule of claim 1, wherein said polynucleotide encodes a polypeptide capable of methylation at the C5 position of cytosine in DNA.

25. (previously presented) The nucleic acid molecule of claim 1, wherein said polynucleotide is that of part (a).

26. (previously presented) The nucleic acid molecule of claim 1, wherein said polynucleotide is that of part (b).

27. (previously presented) The nucleic acid molecule of claim 1, wherein said polynucleotide is that of part (c).

28. (previously presented) The nucleic acid molecule of claim 1, wherein said polynucleotide is that of part (d).

29. (previously presented) The nucleic acid molecule of claim 1, wherein said polynucleotide is that of part (e).

30. (previously presented) The nucleic acid molecule of claim 1, wherein said polynucleotide is that of part (f).

31. (currently amended) An isolated nucleic acid molecule comprising a polynucleotide selected from the group consisting of:

a. a polynucleotide sequence encoding mouse Dnmt3a polypeptide contained in ATCC Deposit No. 209933;

b. a polynucleotide sequence encoding mouse Dnmt3b polypeptide contained in ATCC Deposit No. 209934;

c. a polynucleotide sequence encoding human DNMT3A polypeptide contained in ATCC Deposit No. 98809;

d. a polynucleotide sequence encoding human DNMT3B polypeptide contained in ATCC Deposit No. 326637;

e. a polynucleotide sequence at least 95% identical to the polynucleotide sequence of (a), (b), (c) or (d); and

f. a ~~polynucleotyide~~ polynucleotide sequence complementary to the polynulceotide sequence of (a), (b), (c), (d) or (e).

32. (previously presented) The nucleic acid molecule of claim 31, wherein said polynucleotide is that of part (a).

33. (previously presented) The nucleic acid molecule of claim 31, wherein said polynucleotide is that of part (b).

34. (previously presented) The nucleic acid molecule of claim 31, wherein said polynucleotide is that of part (c).

35. (previously presented) The nucleic acid molecule of claim 31, wherein said polynucleotide is that of part (d).

36. (previously presented) The nucleic acid molecule of claim 31, wherein said polynucleotide is that of part (e).

37. (previously presented) The nucleic acid molecule of claim 31, wherein said polynucleotide is that of part (f).